

**REMOVAL ASSESSMENT  
QUALITY ASSURANCE SAMPLING PLAN  
  
FOR  
  
WILCOX OIL  
WEST 221<sup>ST</sup> STREET SOUTH / REFINERY ROAD  
BRISTOW, CREEK COUNTY, OKLAHOMA**

Prepared for

**U.S. Environmental Protection Agency Region 6**  
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## **1. INTRODUCTION**

Weston Solutions, Inc. (WESTON®), the Superfund Technical Assessment and Response Team (START-3) Contractor, has been tasked by the U.S. Environmental Protection Agency (EPA) Region 6 under Contract Number EP-W-06-042, Technical Direction Document (TDD) No. 5/WESTON-042-15-004 (Appendix C) to conduct a removal assessment at the Wilcox Oil Site located in Bristow, Creek County, Oklahoma. Site coordinates are Latitude 35.842144° North and Longitude -96.381456° West. A Site Location Map is provided as Figure 1-1. All figures are provided as separate portable document format (PDF) files. START-3 has prepared this Quality Assurance Sampling Plan (QASP) to describe the technical scope of work to be completed as part of the TDD.

### **1.1 PROJECT OBJECTIVES**

START-3 is providing technical assistance to EPA Region 6 for performance of the removal assessment and to collect the data necessary to assist EPA in determining if the site presents a threat to public health or welfare of the United States or the environment in accordance with 40 Code of Federal Regulations (CFR) 300.415 as well as the extent of such contamination.

The objective of the removal assessment is to investigate the nature and extent of site-related contaminants in the soil associated with the Wilcox Oil Site. This removal assessment will help determine the location and estimated volume of soil that may need to be removed during the removal phase. The objectives of the removal assessment will be achieved by evaluating both historical data and current analytical results obtained during the collection of samples from representative locations. Soil samples will be analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), total petroleum hydrocarbons (TPHs) and metals.

### **1.2 PROJECT TEAM**

The Project Team will consist of Jeff Criner, START-3 Site Inspection/Assessment Manager; Derrick Cobb, START-3 Project Team Leader (PTL); and additional START-3 personnel as necessary. The PTL will be responsible for the technical quality of work performed in the field and will serve as the START-3 liaison to EPA Region 6 personnel in the field during the site

activities. The PTL, with the concurrence of EPA, will determine the precise location for sample collection in the field, collect samples as necessary, log the activities at each sample location in the field logbook, and verify the sample documentation. The Data Manager will be responsible for entering all samples collected into SCRIBE; producing accurate chain-of-custody documentation for the samples during the assessment; and entering daily operations and sample collection data into the Regional Response Center-Enterprise Data Management System (RRC-EDMS) Response Manager software. The PTL will oversee packaging and shipping of samples to a contracted laboratory. The START-3 PTL will also be responsible for providing overall site health and safety support during the removal assessment field activities.

### **1.3 QASP FORMAT**

This QASP has been organized in a format that is intended to facilitate and effectively meet the objective of the removal assessment. The QASP is organized as follows:

- Section 1 – Introduction
- Section 2 – Site Background
- Section 3 – Sampling Approach and Procedures
- Section 4 – Analytical Methods and Data Validation
- Section 5 – Quality Assurance

Tables are included at the end of each representative section. Figures are provided as separate PDF files. Appendices are attached with the following information:

- Appendix A – Site-Specific Data Quality Objective
- Appendix B – Standard Operating Procedures
- Appendix C – TDD No. 5/WESTON-042-15-004

## **2. SITE BACKGROUND**

Information regarding the site location, description, and site history is included in the following subsections.

### **2.1 SITE LOCATION AND DESCRIPTION**

The Wilcox Oil Site is located approximately 0.35 miles east of US Highway 66 on Refinery Road, in Bristow, Creek County, Oklahoma. The site encompasses a total of 125 acres, approximately 10 acres of which are being investigated as part of this removal assessment. The geographic coordinates of the site are Latitude 35.842144° North and Longitude -96.381456° West. A Site Area Map is provided as Figure 2-1.

The site is flanked by the Turner Turnpike's tollgate to the west, a residential area and the turnpike to the northwest and north, and a wooded area to the east and south. Site access is not controlled, although the residential properties on the site and the south and eastern boundaries of the site are partially fenced with barbed wire. The remaining structures from the former refinery plant and tank farm include former refinery buildings, concrete pads, old tank foundations, and tank berms.

The topography in the vicinity of the site slopes to the south. Surface water runoff would follow the topography in the vicinity of the site. There are two fresh-water ponds on the site, both are currently or historically have been used for fishing. Intermittent streams drain the source areas and flow to the ponds and nearby Sand Creek.

The site includes remnants of former oil refining operations and tank farms. The site has three major former operations areas: two processing areas with surrounding refined product and a crude oil storage area. An active railroad divides the two former processing areas and product storage areas. Most of the refinery structures and tanks have been removed or are in ruins. The tank farm covers approximately 80 acres and has a number of refinery waste source areas of concern, including a backfilled oily waste pond, a breached settling pond, a backfilled oily waste pit, a former pond apparently backfilled with solid refinery waste, and a number of tank bottoms. A Site Plan Map is provided as Figure 2-2.

The site is currently inactive, and a church and six residential properties are located within the former refinery boundaries. The site is mostly rural with some residential, commercial, and industrial areas. Approximately 19 people live on-site and over 5,000 people live within 2 miles.

## **2.2 SITE HISTORY**

The site includes the inactive and abandoned Lorraine and Wilcox Oil Refineries. The property was utilized from 1915 to 1965 by two different refineries with overlapping boundaries. Wilcox Oil Company operated as a crude oil refinery from the 1920s until 1963. A skimming and cracking plant was constructed in 1929. The main components of the plant consisted of a skimming plant, cracking unit, and re-distillation battery with a vapor recovery system and treatment equipment. Wilcox expanded when it acquired the Lorraine Refinery in 1937, which was located adjacent to Wilcox. The two refineries comprised 125 acres. The site includes remnants of former oil refining operations and tank farms.

Multiple sampling site investigations and sampling events have been conducted at the site. Preliminary Assessments (PA), a Site Investigation (SI) and an Expanded Site Investigation (ESI) have been performed by the Oklahoma Department of Environmental Quality. In 2014, the EPA Emergency Rapid Response Services (ERRS) contractor installed a cap with key access on an abandoned drinking water well located near the former location of the First Assembly of God Church. ERRS also installed a fence with signage around an oily sludge pit located on a residential property.

## **2.3 SITE CONCERNS**

The primary concern at the Wilcox Oil Site is the presence of VOCs, SVOCs, TPHs, and metals, specifically lead. The contamination appears to be resulting from the former tank farm and refining processes. Previous investigations have documented lead concentrations in on-site soil as high as 953 milligrams per kilogram (mg/kg).

### **3. SAMPLING APPROACH AND PROCEDURES**

The specific field investigation activities that will be conducted during the Wilcox Oil Site sampling event are presented in the following subsections. Specifically, sampling procedures, locations, quality assurance (QA), and the analytical approach that will be used during the removal assessment are discussed below. Relevant Standard Operating Procedures (SOPs) for field sampling methods are included as an attachment to this QASP.

#### **3.1 OVERVIEW OF SAMPLING ACTIVITIES**

EPA and START-3 developed a sampling strategy intended to collect data necessary to evaluate and meet the objectives of the removal assessment. The data quality objective and an overview of the health and safety and field activities required to complete these tasks are presented in the following subsections.

##### **3.1.1 Data Quality Objective**

The objective of soil sampling is to define the extent of site-related contamination present on-site. To accomplish this, a data quality objective (DQO) for determining the extent of site-related contaminated soil has been established and is included in Appendix A. The DQO presented was developed using the seven-step process set out in the *EPA Guidance for Quality Assurance Project Plans: EPA QA/G-5*.

##### **3.1.2 Health and Safety Implementation**

The removal assessment field activities will be conducted in accordance with a site-specific Health and Safety Plan (HASP). The HASP specifies that on-site soil sampling will proceed in modified Level D personal protective equipment (PPE) (safety glasses, disposable gloves, and steel-toed boots). The PTL will act as the Field Safety Officer (FSO) and will be responsible for implementation of the HASP during the field investigation activities. The START-3 field team will be required to conduct work according to the guidelines and requirements of the HASP. In accordance with the START-3 general health and safety operating procedures, the field team will also drive the route to the hospital specified in the HASP prior to initiating sampling activities.



### **3.1.3 Field Activities Review Meeting**

The START-3 PTL will conduct a meeting with the entire field team to familiarize them with the project scope of work, discuss the planned field activities and roles and responsibilities, and review the project HASP and other relevant START-3 and EPA operating procedures. This meeting will be conducted prior to any site activities.

### **3.1.4 Mobilization and Command Post Establishment**

The START-3 field team will mobilize the equipment required for the removal assessment from the WESTON Regional Equipment Store (RES) warehouse located in Houston, Texas, as necessary.

## **3.2 SAMPLING/MONITORING APPROACH**

Soil sampling will be conducted in general accordance with the EPA *Compendium of Emergency Response Team (ERT) Soil Sampling and Surface Geophysics Procedures* and WESTON Standard Operating Procedures (SOPs). The specific sampling, decontamination, and sample handling procedures, including disposition of investigation-derived waste (IDW), are described in the following subsections.

### **3.2.1 Soil Sampling**

START-3 will collect approximately 190 soil samples (including quality assurance/quality control samples) from 61 sample locations on the site. The EPA OSC and START-3 developed a sampling strategy to collect data from a representative number of locations throughout the site. Figure 3-1 illustrates the sample locations and property lines in more detail.

The EPA On-Scene Coordinator (OSC) and START-3 identified 61 sample locations throughout the site for sampling. Sample locations were identified based on site history and operations, along with preferred surface water-flow patterns. A detailed description of the proposed sampling approach is presented as follows:

- The area directly surrounding the residential properties will be divided into 25-foot by 25-foot grids (30 grids). Each grid will consist of 5-part composite samples. Composite samples will be collected from 0-6 inches below ground surface (bgs).
- The area of potentially high use will be divided into 50-foot by 50-foot grids (4 grids). Each grid will consist of 5-part composite samples. Composite samples will be collected from 0-6 and 6-12 inches below ground surface (bgs).
- The remaining portions of the property will be divided into 100-foot by 100-foot grids (22 grids). Each grid will consist of 5-part composite samples. Composite samples will be collected from 0-6 and 6-12 inches bgs.

### **3.2.2 Investigation-Derived Wastes**

Any excess soil generated as a result of the collection techniques will be returned to the sample collection location. Any liquids associated with equipment decontamination will be stored on-site for future off-site transport and disposal. PPE will be bagged and left on-site for future off-site transport and disposal. It is anticipated that minimal amounts of investigation-derived waste (IDW) will be generated during this activity.

### **3.2.3 Sample Handling Procedures**

Samples will be collected using equipment and procedures appropriate to the matrix, parameters, and sampling objectives. The volume of the sample collected must be sufficient to perform the analysis requested. Samples must be stored in the proper types of containers and preserved in a manner appropriate for the analysis to be performed (SOP 1001.01, 1001.10).

All clean decontaminated sampling equipment and sample containers will be maintained in a clean, segregated area. Samples will be collected with clean decontaminated equipment (SOP 1201.01). Each sample collected for laboratory analysis will be placed directly into pre-cleaned, unused containers. Sampling personnel will don clean gloves between each sample collection/handling. Samples will be assembled and catalogued prior to shipping (SOPs 1101.01 and 1102.01) to the designated laboratory.

### **3.2.4 Quality Assurance/Quality Control Samples**

START-3 will collect field duplicates of soil samples during the removal assessment sampling activities (SOP 1005.01). Quality assurance/quality control (QA/QC) samples will be collected according to the following:

- Blind field duplicate soil samples will be collected during sampling activities at locations selected by the START-3 PTL. The data obtained from these samples will be used to assist in the quality assurance of the sampling procedures and laboratory analytical data by allowing an evaluation of reproducibility of results. Efforts will be made to collect duplicate samples in locations where there is visual evidence of contamination or where contamination is suspected. Blind field duplicate samples will be collected at the rate of 1 duplicate for every 10 samples collected.
- Matrix spike samples will be collected during sampling activities at locations selected by the START-3 PTL. The data obtained from these samples will be used to assist in the quality assurance of the laboratory analytical procedure. Matrix spiking ensures that the laboratory is able to extract an acceptable percentage of a spiked constituent. One matrix spike sample will be collected for every 20 samples submitted for analysis. The matrix spiking analysis often duplicates the spiking procedure on a separate sample volume. Therefore, a complete matrix analysis requires triple sample volume. Based on EPA CLP requirements, START-3 will collect a MS/MSD for the rinsate sample collected.

### **3.3 SAMPLE MANAGEMENT**

Specific nomenclature that will be used by START-3 will provide a consistent means to facilitate the sampling and overall data management for the project (SOP 0110.01). Any deviations from the sample nomenclature proposed below must be approved by the EPA OSC and START-3 Site Inspection/Assessment Manager. The general nomenclature consists of the following components:

- Geographic location or on-site sample location.
- QA/QC Type (normal, duplicate, rinsate blank, etc.).
- Sequence (e.g., which sample it represents).
- Date (of sample activity).

The following presents the sample nomenclature for analytical samples that will generate unique sample names compatible with most data management systems. The sample nomenclature is based upon specific requirements for the reporting of these results.

**SAMPLE NOMENCLATURE - SOIL AND SEDIMENT****Site Name – Property ID - Grid ID - Depth - Collection Type + QC Type****Where:**

**Grid ID:** A three-digit identifier used to designate the particular Area of Concern (AOC) where the sample was collected.

**Depth:** A two-digit code used to designate what depth of sample was collected:

00	Surface
06	0 to 6 inches
12	6 to 12 inches

**Collection Type:** A one-digit code used to designate what type of sample was collected:

1	Surface Water
2	Ground Water
3	Leachate
4	Field QC/Water Sample
5	Soil/Sediment

6	Oil
7	Waste
8	Other
9	Drinking Water

**QC Type:** A one-digit code used to designate the QC type of the sample:

1	Normal
2	Duplicate
3	Rinsate Blank
4	Trip Blank
5	Field Blank
6	Confirmation

**Examples:**

- **B01-06-51:** Represents the normal soil sample collected from Grid B01 as identified on the Sample Location Map from 0 to 6 inches of depth.
- **B01-06-52:** Represents the duplicate soil sample from Grid B01 as identified on the Sample Location Map from 0 to 6 inches of depth.

**3.4 DECONTAMINATION**

The non-disposable sampling equipment used during the sample collection process will be thoroughly decontaminated before initial use, between use, and at the end of the field investigation. Equipment decontamination will be completed in the following steps:

1. Non-phosphate detergent and potable water wash to clean the equipment.
2. Final potable water rinse.
3. Equipment air-dried.

Decontamination activities will be conducted at a temporary decontamination pad that will be constructed in an area identified prior to the beginning of field activities (SOP 1201.01).

Excess soil and fluids generated as a result of equipment decontamination will be placed in a drum and staged on-site. The drum will be labelled on the side with the name of the site, the contents, sampling location, and date.

### **3.5 SAMPLE PRESERVATION, CONTAINERS, AND HOLD TIMES**

Once collected, samples will be stored in coolers and kept at approximately 4° C while at the site and until they are submitted for analysis. Samples that have been analyzed will be disposed of by the designated laboratory in accordance with the laboratory SOPs.

**Table 3-1**  
**Requirements for Containers, Preservation**  
**Techniques, Sample Volumes, and Holding Times**

Name	Analytical Methods	Container <sup>a</sup>	Preservation <sup>b</sup>	Minimum Sample Volume or Weight	Maximum Holding Time
Volatile Organic Compounds (VOCs)	SW846 5035/8260	G	4°C	5 grams/4 ounces (soil)/ 3, 40 mL VOA vials (water)	48 hours to freezing (soil)/ 7 days to analysis, 14 days to analysis (water)
Semi Volatile Organic Compounds (SVOCs)	SW846 8270	G	4°C	4 ounces (soil)/ 2, 1 Liter (water)	14 days to extraction and 40 days to analysis (soil) / 7 days to extraction and 40 days to analysis (water)
Total Petroleum Hydrocarbons (TPHs)	1005	G	4°C	4 ounces (soil)/ 2, 1 Liter (water)	14 days to extraction and 40 days to analysis (soil) / 7 days to extraction and 40 days to analysis (water)
Metals	SW846 6010B	G	4°C	4 ounces	180 days (soil and water)

<sup>a</sup> glass (G).

<sup>b</sup> No pH adjustment for soil.

#### **4. ANALYTICAL METHODS AND DATA VALIDATION**

Samples collected by START-3 will be analyzed by a Test America laboratory located in Houston, Texas. The following methods of analysis will be conducted on all samples submitted:

- Metals - SW846 6010B
- Volatile Organic Compounds - SW846 5035/8260
- Semi-Volatile Organic Compounds - SW846 8270
- Total Petroleum Hydrocarbons - 1005

Data validation from samples sent to the laboratory will be conducted by START-3. START-3 will provide an evaluation of QA/QC samples for reporting purposes. Data validation will be conducted in accordance with the EPA CLP National Function Guidelines for Superfund Inorganic Methods Data Review (January 2010).

## **5. QUALITY ASSURANCE**

Quality assurance will be conducted in accordance with the WESTON Corporate Quality Management and Programmatic Quality Assurance Project Plan (QAPP), dated December 2009, and the WESTON START-3 Quality Management Plan, dated July 2009. The START-3 PTL will be responsible for QA/QC of the field investigation activities. The designated laboratory utilized during the investigation will be responsible for QA/QC related to the analytical work. START-3 will also collect samples to verify that laboratory QA/QC is consistent with the required standards as discussed in the QAPP.

### **5.1 SAMPLE CHAIN-OF-CUSTODY PROCEDURES**

Documents will be completed legibly and in ink and by entry into field logbooks, Response Manager, or SCRIBE. Response Manager is the Enterprise Data Collection System designed to provide near real-time access to non-analytical data normally collected in logbooks. Response Manager provides a standard data collection interface for modules of data normally collected by START-3 field personnel while on-site. These modules fall into two basic categories for Response and Removal. The modules include Emergency Response, Reconnaissance, Facility Assessment, Shipping, Containers, Materials, Calls, HHW, and General/Site-specific data. The system provides users with a standard template for laptop/desktop/tablet PCs that will synchronize to the secure web interface using merge replication technology to provide access to field collected data on the RRC-EDMS EPA Web Hub. Response Manager also includes a PDA application that provides some of the standard data entry templates from Response Manager to users for field data entry. Response Manager also includes an integrated GPS unit with the secure PDA application, and the coordinates collected in Response Manager are automatically mapped on the RRC-EDMS interactive mapping site. GIS personnel can then access this data to provide comprehensive site maps for decision-making support.

Response Manager also includes an Analytical Module that is designed to give SCRIBE users the ability to synchronize the SCRIBE field data to the RRC-EDMS Web Hub. This allows analytical data managers and data validators access to data to perform reviews from anywhere with an Internet connection. The Analytical Module is designed to take the analytical data entered into EPA SCRIBE software and make it available for multiple users to access on one



site. START-3 personnel will utilize SCRIBE for all data entry on-site and will upload to the Response Manager Analytical Module.

### **Field Documentation**

The following field documentation will be maintained as described below.

#### **Field Logbook**

The field logbook is a descriptive notebook detailing site activities and observations so that an accurate, factual account of field procedures may be reconstructed (SOP 1501.01). All entries will be signed by the individuals making them. Entries should include, at a minimum, the following:

- Site name and project number.
- Names of personnel on-site.
- Dates and times of all entries.
- Description of all site activities, including site entry and exit times.
- Noteworthy events and discussions.
- Weather conditions.
- Site observations.
- Identification and description of samples and locations.
- Subcontractor information and names of on-site personnel.
- Dates and times of sample collections and chain-of-custody information.
- Records of photographs.
- Site sketches.
- Calibration results.

#### **Sample Labels**

Sample labels will be securely affixed to the sample container. The labels will clearly identify the particular sample and include the following information:

- Site name and project number.
- Date and time the sample was collected.
- Sample preservation method.
- Analysis requested.
- Sampling location.

## **Chain-of-Custody Record**

A chain-of-custody will be maintained from the time of sample collection until final deposition. Every transfer of custody will be noted and signed for and a copy of the record will be kept by each individual who has signed it.

## **Custody Seal**

Custody seals demonstrate that a sample container has not been tampered with or opened. The individual who has custody of the samples will sign and date the seal and affix it to the container in such a manner that it cannot be opened without breaking the seal.

## **Response Manager**

START-3 will use the Response Manager module located on the EPA Web Hub, <https://solutions.westonproject.net/epawebhub/>, to compile and organize the data collected from project activities. The information to be included encompasses some or all of the following depending on the specific project needs:

- General Module – site-specific data including location and type of site. It also includes an area for key site locations including geo-spatial data associated with the key site locations.
- Emergency Response Module – includes the following sub-modules: Basic Info, HAZMAT, Release, Time Line Log, Incident Zones, Photos, Sensitive Receptors, Evacuations, Source, Cause, and Weather.
- Reconnaissance Module – provides standard templates with the flexibility of adding any additional questions of values to the drop-down lists for targeted reconnaissance efforts. Typically the data in this module is associated with ESF-10 deployments and the clean-up of orphaned containers and hazardous debris, but the module can be utilized for any or all reconnaissance activities.
- Facility Assessment Module – provides standard templates with the flexibility of adding any additional questions of values to the drop-down lists for assessments of structures. Typically utilized for EPA-regulated program facilities during an ESF-10 deployment of resources. This module can be utilized to track the assessment of any facilities including multiple assessments of the fixed facilities.
- Shipping Module – provides standard templates for creating a cradle-to-grave record of all waste shipments from the site until they are recycled or destroyed. This includes the ability to capture manifests and manifest line items and upload photos/original documents to support the records.

- Container Module – provides standard templates for cataloguing containers including HAZCAT and Layer information in each container. The module also allows for tracking which containers are bulked.
- Properties Module – provides standard templates with the flexibility of adding any additional questions of values to the drop-down lists for collection of property data including access agreements and assessments of the property and current status of property regarding the site removal action.
- Materials Module – provides standard templates for tracking materials that are brought on-site or that are removed from the site.
- Daily Reports – provides standard templates for tracking daily site activities, daily site personnel, and daily site notes for reporting back to the EPA OSC in a POLREP or SITREP.
- HHW Module – provides standard templates with the flexibility of adding any additional questions of values to the drop-down lists for tracking the amount of HHW collected at individual collection stations by HHW type.
- Data Files – data files can be uploaded in the photo module section and be associated with individual records or with the site in general. The meta-data associated with that data file can be filled in using the photo log fields.

The data stored in the Response Manager database can be viewed and edited by any individual with access rights to those functions. At any time deemed necessary, POLREPs and/or SITREPs can be generated by exporting the data out of Response Manager into Microsoft Excel/Word. The database is stored on a secure server and backed up regularly.

## **5.2 REPORT PREPARATION**

At the completion of the project, START-3 will review and evaluate the laboratory data and prepare a draft report of field activities, figures, and analytical results for EPA OSC review. Draft deliverable documents will be uploaded to the EPA TeamLink website for EPA OSC review and comment.